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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/574,718

**Applicant(s)**

LEE ET AL.

**Examiner**

CYNTHIA SZEWCZYK

**Art Unit**

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**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/5506)
- Paper No(s)/Mail Date 4/5/06
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This is the initial office action for LEE et al. application no. 10/574,718 filed April 5, 2006 which is a national stage entry of PCT/KR04/01146 filed June 17, 2004.
2. Claims 13-41 are currently pending and have been considered.

### ***Priority***

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 13, 15 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by LATOS (US 3,880,969).

LATOS discloses that it is known in the prior art to impregnate a polyurethane foam (polymer sponge of instant claim 13) with an aqueous slurry of sodium silicate (inorganic adhesive of instant claims 13 and 15) (col. 1, lines 15-20). The impregnated sponge is removed of excess slurry (dewatering of instant claim 13) and dried (drying of instant claim 13) (col. 1, lines 21-23). LATOS discloses that the prior art method

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produced an open celled porous structure (porous ceramic body of instant claim 39) (col. 1, lines 25-26).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969).

LATOS discloses a method for producing porous ceramic structures. LATOS fails to disclose that the impregnating, dewatering, and drying steps are performed several times. It would have been obvious to perform the steps several times because a person of ordinary skill in the art would have known that it would have caused increased impregnation into the sponge, which would have been a desirable result. Therefore, the claimed invention would have been obvious.

LATOS discloses a method for producing porous ceramic structures. LATOS fails to disclose that the impregnating, dewatering, and drying steps are performed several times. It would have been obvious to perform the steps several times because a person of ordinary skill in the art would have known that it would have caused increased impregnation into the sponge, which would have been a desirable result. Therefore, the claimed invention would have been obvious.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of YASUDA et al. (US 3,886,100).

LATOS discloses a method for producing porous ceramic structures. LATOS fails to disclose that the adhesive is mixed with a surfactant. YASUDA et al. discloses a method of manufacturing polymer particles cross-linked uniformly by impregnating a cross-linking agent into polymer particles. YASUDA et al. discloses that a surfactant is added to the impregnation solution in order to add the solution homogenously to the polymer (col. 4, lines 13, 42-44). It would have been obvious to add a surfactant to the adhesive of LATOS to ensure that the adhesive would have been dispersed homogenously during the impregnation. Therefore, the claimed invention would have been obvious.

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of HORIUCHI et al. (US 5,919,546).

LATOS discloses a method for producing porous ceramic structures. LATOS fails to disclose that the adhesive is mixed with either silane coupling agents or an organic adhesive. HORIUCHI et al. discloses a porous ceramic impregnated wiring body. HORIUCHI et al. discloses that a silane coupling agent can be impregnated to improve adhesion property (col. 4, lines 60-63). It would have been obvious to mix the silane coupling agents with the inorganic adhesive of LATOS to improve the adhesion property. Therefore, the claimed invention would have been obvious.

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of JIN (US 6,296,699 B1).

LATOS discloses a method for producing porous ceramic structures. LATOS fails to disclose that the adhesive is mixed with either sodium silicofluoride or magnesium sulfate. JIN discloses that sodium silicofluoride is a known hardener for use with alkali metal silicates (col. 6, lines 67 – col. 7, lines 1-6). Since the adhesive in LATOS is sodium silicate, it would have been obvious that adding sodium silicofluoride would have added strength to the ceramic structure produced by LATOS. Therefore, the claimed invention would have been obvious.

12. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of BOUTLE (US 4,157,424).

LATOS discloses a method for producing porous ceramic structures. LATOS fails to disclose that the adhesive is mixed with a water repellant. BOUTLE discloses a

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method for producing porous materials. BOUTLE discloses that a surface active agent may affect the ability of a porous body to become wetted by liquids (col. 4, lines 23-27). It would have been obvious to one of ordinary skill in the art to add water repellant to the adhesive mixture of LATOS in order to make the ceramic hydrophobic. This would produce a ceramic product that would be ideal for use in water. Therefore, the claimed invention would have been obvious.

13. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of CROOKE et al. (US 4,332,753).

LATOS discloses a method for producing porous ceramic structures. LATOS fails to disclose that the adhesive is mixed with phosphate. CROOKE et al. discloses a method of making a porous refractory material. CROOKE discloses that a sponge is impregnated with a suspension of refractory material, then squeezed to remove excess suspension and finally allowed to dry (col. 1, lines 8-15). CROOKE et al. discloses that suitable sponge can be composed of polyurethane (col. 2, lines 14-16) as in LATOS. CROOKE et al. discloses that the impregnation suspension can have a phosphate additive to produce temporary or permanent bonds and impart desirable properties such as thixotrophy, wetting ability, and mould resistance (col. 2, lines 22-26). It would have been obvious to add phosphate to the adhesive to adjust the properties of the finished ceramic to desirable settings. Therefore, the claimed invention would have been obvious.

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14. Claim 21- 23, 29, and 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of TANSILL (US 4,272,898) and FUMA et al. (US 4,623,499).

LATOS discloses a method for producing porous ceramic structures wherein the polyurethane foam is impregnated with an aqueous slurry of sodium silicate (col. 1, lines 15-20). LATOS fails to disclose that a curing agent is added into the pores of the sponge. TANSILL discloses a resin-coated fiber mass containing catalyst-filled hollow fibers. TANSILL discloses that a liquid curing agent can be impregnated into the pores of a polyurethane foamed material (col. 10, lines 48-54). FUMA et al. discloses a method for manufacture of a shaped article of organic substance. FUMA et al. discloses that a gaseous curing agent can be passed through a structure to aid curing and encourage solidification (abstract). It would have been obvious to one of ordinary skill in the art that a gaseous curing agent could be used as the curing agent of TANSILL because a gaseous curing agent would fit into smaller pores easier. It would have been obvious to insert a gaseous into the pores of LATOS because that would have helped solidify the product. It would have been obvious to perform the steps several times because a person of ordinary skill in the art would have known that it would have caused increased impregnation into the sponge, which would have been a desirable result. Therefore, the claimed invention would have been obvious.

15. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of TANSILL (US 4,272,898) and FUMA et al. (US 4,623,499) as



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applied to claims 21- 23, 29, and 40 above, and further in view of YASUDA et al. (US 3,886,100).

LATOS as modified by TANSILL and FUMA et al. discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with a surfactant. YASUDA et al. discloses a method of manufacturing polymer particles cross-linked uniformly by impregnating a cross-linking agent into polymer particles. YASUDA et al. discloses that a surfactant is added to the impregnation solution in order to add the solution homogenously to the polymer (col. 4, lines 13, 42-44). It would have been obvious to add a surfactant to the adhesive of modified LATOS to ensure that the adhesive would have been dispersed homogenously during the impregnation. Therefore, the claimed invention would have been obvious.

16. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of TANSILL (US 4,272,898) and FUMA et al. (US 4,623,499) as applied to claims 21- 23, 29, and 40 above, and further in view of HORIUCHI et al. (US 5,919,546).

LATOS as modified by TANSILL and FUMA et al. discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with either silane coupling agents or an organic adhesive. HORIUCHI et al. discloses a porous ceramic impregnated wiring body. HORIUCHI et al. discloses that a silane coupling agent can be impregnated to improve adhesion property (col. 4, lines 60-63). It would have been obvious to mix the silane coupling

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agents with the inorganic adhesive of modified LATOS to improve the adhesion property. Therefore, the claimed invention would have been obvious.

17. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of TANSILL (US 4,272,898) and FUMA et al. (US 4,623,499) as applied to claims 21- 23, 29, and 40 above, and further in view of JIN (US 6,296,699 B1).

LATOS as modified by TANSILL and FUMA et al. discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with either sodium silicofluoride or magnesium sulfate. JIN discloses that sodium silicofluoride is a known hardener for use with alkali metal silicates (col. 6, lines 67 – col. 7, lines 1-6). Since the adhesive in modified LATOS is sodium silicate, it would have been obvious that adding sodium silicofluoride would have added strength to the ceramic structure produced by modified LATOS. Therefore, the claimed invention would have been obvious.

18. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of TANSILL (US 4,272,898) and FUMA et al. (US 4,623,499) as applied to claims 21- 23, 29, and 40 above, and further in view of BOUTLE (US 4,157,424).

LATOS as modified by TANSILL and FUMA et al. discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the

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adhesive is mixed with a water repellant. BOUTLE discloses a method for producing porous materials. BOUTLE discloses that a surface active agent may affect the ability of a porous body to become wetted by liquids (col. 4, lines 23-27). It would have been obvious to one of ordinary skill in the art to add water repellant to the adhesive mixture of modified LATOS in order to make the ceramic hydrophobic. This would produce a ceramic product that would be ideal for use in water. Therefore, the claimed invention would have been obvious.

19. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of TANSILL (US 4,272,898) and FUMA et al. (US 4,623,499) as applied to claims 21- 23, 29, and 40 above, and further in view of CROOKE et al. (US 4,332,753).

LATOS as modified by TANSILL and FUMA et al. discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with phosphate. CROOKE et al. discloses a method of making a porous refractory material. CROOKE discloses that a sponge is impregnated with a suspension of refractory material, then squeezed to remove excess suspension and finally allowed to dry (col. 1, lines 8-15). CROOKE et al. discloses that suitable sponge can be composed of polyurethane (col. 2, lines 14-16) as in modified LATOS. CROOKE et al. discloses that the impregnation suspension can have a phosphate additive to produce temporary or permanent bonds and impart desirable properties such as thixotrophy, wetting ability, and mould resistance (col. 2, lines 22-26). It would have

been obvious to add phosphate to the adhesive to adjust the properties of the finished ceramic to desirable settings. Therefore, the claimed invention would have been obvious.

20. Claims 30-32, 38 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of ANDERSSON (US 4,483,889).

LATOS discloses a method for producing porous ceramic structures wherein the polyurethane foam is impregnated with an aqueous slurry of sodium silicate (col. 1, lines 15-20). LATOS fails to disclose that a curing agent is combined with the adhesive or that the process is repeated. ANDERSSON discloses a method for the production of fibre composite materials impregnated with resin. ANDERSSON discloses that conventional additives can be used in the impregnation solution, such as curing catalysts (col. 4, lines 42-44). It would have been obvious to one of ordinary skill in the art to add a curing agent to the adhesive mixture of LATOS because that would provide better control of the curing process. It would have been obvious to perform the steps several times because a person of ordinary skill in the art would have known that it would have caused increased impregnation into the sponge, which would have been a desirable result. Therefore, the claimed invention would have been obvious.

21. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of ANDERSSON (US 4,483,889) as applied to claims 30-32, 38 and 41 above, and further in view of YASUDA et al. (US 3,886,100).

LATOS as modified by ANDERSSON discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with a surfactant. YASUDA et al. discloses a method of manufacturing polymer particles cross-linked uniformly by impregnating a cross-linking agent into polymer particles. YASUDA et al. discloses that a surfactant is added to the impregnation solution in order to add the solution homogenously to the polymer (col. 4, lines 13, 42-44). It would have been obvious to add a surfactant to the adhesive of modified LATOS to ensure that the adhesive would have been dispersed homogenously during the impregnation. Therefore, the claimed invention would have been obvious.

22. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of ANDERSSON (US 4,483,889) as applied to claims 30-32, 38 and 41 above, and further in view of HORIUCHI et al. (US 5,919,546).

LATOS as modified by ANDERSSON discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with either silane coupling agents or an organic adhesive. HORIUCHI et al. discloses a porous ceramic impregnated wiring body. HORIUCHI et al. discloses that a silane coupling agent can be impregnated to improve adhesion property (col. 4, lines 60-63). It would have been obvious to mix the silane coupling agents with the inorganic adhesive of modified LATOS to improve the adhesion property. Therefore, the claimed invention would have been obvious.

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23. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of ANDERSSON (US 4,483,889) as applied to claims 30-32, 38 and 41 above, and further in view of JIN (US 6,296,699 B1).

LATOS as modified by ANDERSSON discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with either sodium silicofluoride or magnesium sulfate. JIN discloses that sodium silicofluoride is a known hardener for use with alkali metal silicates (col. 6, lines 67 – col. 7, lines 1-6). Since the adhesive in modified LATOS is sodium silicate, it would have been obvious that adding sodium silicofluoride would have added strength to the ceramic structure produced by modified LATOS. Therefore, the claimed invention would have been obvious.

24. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of ANDERSSON (US 4,483,889) as applied to claims 30-32, 38 and 41 above, and further in view of BOUTLE (US 4,157,424).

LATOS as modified by ANDERSSON discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with a water repellant. BOUTLE discloses a method for producing porous materials. BOUTLE discloses that a surface active agent may affect the ability of a porous body to become wetted by liquids (col. 4, lines 23-27). It would have been obvious to one of ordinary skill in the art to add water repellant to the adhesive mixture of modified LATOS in order

to make the ceramic hydrophobic. This would produce a ceramic product that would be ideal for use in water. Therefore, the claimed invention would have been obvious.

25. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over LATOS (US 3,880,969) in view of ANDERSSON (US 4,483,889) as applied to claims 30-32, 38 and 41 above, and further in view of CROOKE et al. (US 4,332,753).

LATOS as modified by ANDERSSON discloses a method for producing porous ceramic structures. Modified LATOS fails to disclose that the adhesive is mixed with phosphate. CROOKE et al. discloses a method of making a porous refractory material. CROOKE discloses that a sponge is impregnated with a suspension of refractory material, then squeezed to remove excess suspension and finally allowed to dry (col. 1, lines 8-15). CROOKE et al. discloses that suitable sponge can be composed of polyurethane (col. 2, lines 14-16) as in modified LATOS. CROOKE et al. discloses that the impregnation suspension can have a phosphate additive to produce temporary or permanent bonds and impart desirable properties such as thixotrophy, wetting ability, and mould resistance (col. 2, lines 22-26). It would have been obvious to add phosphate to the adhesive to adjust the properties of the finished ceramic to desirable settings. Therefore, the claimed invention would have been obvious.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA SZEWCZYK whose telephone number is

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(571)270-5130. The examiner can normally be reached on Monday through Thursday 7:30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Steven P. Griffin/  
Supervisory Patent Examiner, Art  
Unit 1791

CS